Long-term juvenile coral density data from St. John USVI starting in 1994.

Website: https://www.bco-dmo.org/dataset/736783
Data Type: Other Field Results
Version: 1
Version Date: 2018-05-17

Project
» LTREB Long-term coral reef community dynamics in St. John, USVI: 1987-2019 (St. John LTREB)

Contributors	Affiliation	Role
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Coverage

Spatial Extent: **N**:18.317 **E**:-64.72 **S**:18.307 **W**:-64.73
Temporal Extent: 1994-01 - 2016-09

Dataset Description

Coral larvae are selective with regards to the surfaces upon which they settle, but little is known about the outcome of these choices. In this study, we explored the implications for juvenile scleractinians (less than 40-mm diameter) of growing on igneous versus carbonate rock on the shallow reefs (5-m depth) of St. John, US Virgin Islands. Surveys revealed that juvenile corals occurred at densities of 16 colonies m− 2 and were distributed on igneous and carbonate rocks in proportion to the abundance of these surfaces, suggesting that larvae do not discriminate between rock types at settlement. Repeated surveys demonstrated that all juvenile corals (i.e., pooled among taxa) grew 41% slower on igneous versus carbonate rock between January and August, but not between August and January when the growth was statistically indistinguishable between rock types. Although the growth of the most common juvenile coral, Porites astreoides, was similar on both substrata, the photophysiology of this species was affected by the type of rock. The maximum relative electron transfer rate (rETR, a proxy for photosynthesis) of P. astreoides was down-regulated 30% on igneous compared to carbonate rock. Phylogenetic analyses of the Symbiodinium community sequence profiles within P. astreoides revealed significant differences between substrata, with a greater diversity of co-occurring ITS-2 sequences in corals growing on carbonate compared to igneous rock. While substratum-dependent patterns in the characteristics of juvenile corals suggested there is selective value to the settlement choices made by larvae, these trends did not translate into differences in survival, at least over the time scale investigated. It remains uncertain what features of the rocks affected coral performance, but differences in the temperature of the rock may be an important feature during the warmest period of the year.

Methods & Sampling

These data are from 5-9 m depth and describe the density of small corals ≤ 40 mm diameter.

Data Processing Description

BCO-DMO Processing Notes:

-Reformatted column names to comply with BCO-DMO standards.
-Added latitude and longitude to data

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Data Files

File
juveniles.csv (Comma Separated Values (.csv), 415.12 KB) MD5:70fb98963a1a7a3fa579dddcd6845d4e Primary data file for dataset ID 736783

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Related Publications

Green, D. H., Edmunds, P. J., Pochon, X., & Gates, R. D. (2010). The effects of substratum type on the growth, mortality, and photophysiology of juvenile corals in St. John, US Virgin Islands. Journal of Experimental Marine Biology and Ecology, 384(1-2), 18–29. doi:10.1016/j.jembe.2009.12.008
Methods

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Parameters

Parameter	Description	Units
Site	Site where juvenile corals were sampled.	unitless
lat	Latitude of site	decimal degrees
lon	Longitude of site	decimal degrees
Quadrat	Unique quadrat where corals were censused.	unitless
Year	Year of survey; YYYY	unitless
Acropora	Density of colonies per 0.25m^2.	millimeters per meters squared
Agaricia	Density of colonies per 0.25m^2.	millimeters per meters squared
Colpohyllia	Density of colonies per 0.25m^2.	millimeters per meters squared

Dichocoenia	Density of colonies per 0.25m^2.	millimeters per meters squared
Diplora	Density of colonies per 0.25m^2.	millimeters per meters squared
Eusmilia	Density of colonies per 0.25m^2.	millimeters per meters squared
Favia	Density of colonies per 0.25m^2.	millimeters per meters squared
Helioseris	Density of colonies per 0.25m^2.	millimeters per meters squared
Isophyllastrea	Density of colonies per 0.25m^2.	millimeters per meters squared
Madracis	Density of colonies per 0.25m^2.	millimeters per meters squared
Manicina	Density of colonies per 0.25m^2.	millimeters per meters squared
Meandrina	Density of colonies per 0.25m^2.	millimeters per meters squared
Montastraea	Density of colonies per 0.25m^2. Only M. cavernosa.	millimeters per meters squared
Mycetophyllia	Density of colonies per 0.25m^2.	millimeters per meters squared
Porites	Density of colonies per 0.25m^2.	millimeters per meters squared
Scolymia	Density of colonies per 0.25m^2.	millimeters per meters squared
Siderastrea	Density of colonies per 0.25m^2.	millimeters per meters squared
Stephanocoenia	Density of colonies per 0.25m^2.	millimeters per meters squared
Orbicella	Density of colonies per 0.25m^2.	millimeters per meters squared
Total	Density of all small colonies per 0.25m^2.	millimeters per meters squared

Total_less_Sr_and_Ff	All small colonies less Favia fragum and Sidersastrea radians that are sexually mature at < 4 cm diameter and therefore are not juveniles.	millimeters per meters squared

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Instruments

Dataset-specific Instrument Name	Camera
Generic Instrument Name	Camera
Dataset-specific Description	Used to take photographs of coral
Generic Instrument Description	All types of photographic equipment including stills, video, film and digital systems.

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Deployments

Edmunds_VINP

Website	https://www.bco-dmo.org/deployment/523357
Platform	Virgin Islands National Park
Start Date	1987-01-01
End Date	2016-09-01
Description	Studies of corals and hermit crabs

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Project Information

LTREB Long-term coral reef community dynamics in St. John, USVI: 1987-2019 (St. John LTREB)

Website: http://coralreefs.csun.edu/

Coverage: St. John, U.S. Virgin Islands; California State University Northridge

Long Term Research in Environmental Biology (LTREB) in US Virgin Islands:

From the NSF award abstract:
In an era of growing human pressures on natural resources, there is a critical need to understand how major ecosystems will respond, the extent to which resource management can lessen the implications of these responses, and the likely state of these ecosystems in the future. Time-series analyses of community structure provide a vital tool in meeting these needs and promise a profound understanding of community change. This study focuses on coral reef ecosystems; an existing time-series analysis of the coral community structure on the reefs of St. John, US Virgin Islands, will be expanded to 27 years of continuous data in annual increments. Expansion of the core time-series data will be used to address five questions: (1) To what extent is the ecology at a small spatial scale (1-2 km) representative of regional scale events (10's of km)? (2) What are the effects of declining coral cover in modifying the genetic population structure of the coral host and its algal symbionts? (3) What are the roles of pre- versus post-settlement events in determining the population dynamics of small corals? (4) What role do physical forcing agents (other than temperature) play in driving the population

dynamics of juvenile corals? and (5) How are populations of other, non-coral invertebrates responding to decadal-scale declines in coral cover? Ecological methods identical to those used over the last two decades will be supplemented by molecular genetic tools to understand the extent to which declining coral cover is affecting the genetic diversity of the corals remaining. An information management program will be implemented to create broad access by the scientific community to the entire data set.

The importance of this study lies in the extreme longevity of the data describing coral reefs in a unique ecological context, and the immense potential that these data possess for understanding both the patterns of comprehensive community change (i.e., involving corals, other invertebrates, and genetic diversity), and the processes driving them. Importantly, as this project is closely integrated with resource management within the VI National Park, as well as larger efforts to study coral reefs in the US through the NSF Moorea Coral Reef LTER, it has a strong potential to have scientific and management implications that extend further than the location of the study.

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Funding

Funding Source	Award
NSF Division of Environmental Biology (NSF DEB)	DEB-0841441

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